UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/510,143	04/19/2005	Jan Andersson	1739	8644

7590 03/08/2006

Alfred J Mangels
4729 Cornell Road
Cincinnati, OH 45241-2433

EXAMINER	
RALIS, STEPHEN J	
ART UNIT	**PAPER NUMBER**
3742	

DATE MAILED: 03/08/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/510,143	ANDERSSON ET AL.	
	Examiner	Art Unit	
	Stephen J. Ralis	3742	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 October 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *10/03/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Priority

1. Acknowledgment is made of applicant's claim for foreign priority benefit of PCT Application No. SE03/00386, filed 03 July 2003, and further of Sweden Application No. 0201041-1, filed 05 April 2002.

Specification

The following guidelines illustrate the preferred layout for the specification of a utility application. These guidelines are suggested for the applicant's use.

Arrangement of the Specification

As provided in 37 CFR 1.77(b), the specification of a utility application should include the following sections in order. Each of the lettered items should appear in upper case, without underlining or bold type, as a section heading. If no text follows the section heading, the phrase "Not Applicable" should follow the section heading:

(a) TITLE OF THE INVENTION.
(b) CROSS-REFERENCE TO RELATED APPLICATIONS.
(c) STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT.
(d) THE NAMES OF THE PARTIES TO A JOINT RESEARCH AGREEMENT
(e) INCORPORATION-BY-REFERENCE OF MATERIAL SUBMITTED ON A COMPACT DISC (See 37 CFR 1.52(e)(5) and MPEP 608.05. Computer program listings (37 CFR 1.96(c)), "Sequence Listings" (37 CFR 1.821(c)), and tables having more than 50 pages of text are permitted to be submitted on compact discs.) or
REFERENCE TO A "MICROFICHE APPENDIX" (See MPEP § 608.05(a). "Microfiche Appendices" were accepted by the Office until March 1, 2001.)
(f) BACKGROUND OF THE INVENTION.
(1) Field of the Invention.
(2) Description of Related Art including information disclosed under 37 CFR 1.97 and 1.98.
(g) BRIEF SUMMARY OF THE INVENTION.
(h) BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING(S).

(i) DETAILED DESCRIPTION OF THE INVENTION.
(j) CLAIM OR CLAIMS (commencing on a separate sheet).
(k) ABSTRACT OF THE DISCLOSURE (commencing on a separate sheet).
(l) SEQUENCE LISTING (See MPEP § 2424 and 37 CFR 1.821-1.825. A "Sequence Listing" is required on paper if the application discloses a nucleotide or amino acid sequence as defined in 37 CFR 1.821(a) and if the required "Sequence Listing" is not submitted as an electronic document on compact disc).

2. The disclosure is objected to because of the following informalities: item (b) CROSS-REFERENCE TO RELATED APPLICATIONS is not listed in the specification.

Appropriate correction is required.

Drawings

3. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the " $r = \frac{ro}{lo}\sqrt{l}$ " relationship; dimensions of the glow zone/union zone interface with respect to wall thickness must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate

changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

4. Claims 2 and 4-6 are objected to because of the following informalities:

Claim 2, line 3, "a transition region" should read –the transition region–.

Claim 4, line 3, "an element" should read –the element–.

Claim 5, line 2, "a respective union" should read –the respective union–; line 3, "a respective end" should read the –respective end–.

Claim 6, line 2, "a respective union" should read –the respective union–; line 3, "a respective power supply terminal" should read –the respective power supply terminal–.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1, 5 and 6 are rejected under 35 U.S.C. 102(b) as being anticipated by Heine et al. (U.S. Patent No. 4,101,724).

Heine et al. disclose an electrical resistance element comprising: a glow zone/heating tubes 36 and two power supply terminals 66, wherein the glow zone of the element is tubular (column 1, lines 58-65; i.e. heating tubes 36; column 4, lines 4-12, 27-35; see Figures 5, 6); a union (i.e. connector extensions 58, 60; column 4, lines 27-35; see Figures 5, 6) extending from each of respective power supply terminals 66 to respective ends of the glow zone (i.e. 54, 56), wherein each union is tubular (i.e. open end portion with vent opening 61) and has substantially the same outer diameter as the glow zone; and wherein each union has an end facing towards the glow zone (i.e. connector extensions 58, 60 facing respective ends 54, 56 of the glow zone/heating tubes 36); a transition region adjacent an end of each union and glow zone end (i.e. tapering; column 5, lines 42-54; see Figures 5, 6), the transition region having a progressively decreasing wall thickness in a direction from the union towards the glow zone, wherein the glow zone has substantially the same inner diameter as the largest inner diameter of the transition region (column 5, lines 44-48); wherein the respective union is welded to the respective end of the glow zone (column 4, lines 30-35); wherein the respective union and the respective power supply terminal together form a one-piece structure (i.e. connector extensions 58, 60 with two power supply terminals 66;column 4, lines 48-51; see Figures 5, 6). As the reference meets all material limitations of the claims at hand, the reference is anticipatory.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

9. Claims 2-4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Heine et al. (U.S. Patent No. 4,101,724).

10. With respect to the limitations of claim 2, Heine et al. disclose an electrical resistance element, as set forth in claim 1 of paragraph 6,except for wherein the successively decreasing wall thickness is defined by a transition region inner surface having a radius that follows the function $r = \sqrt[ro]{lo}\ \sqrt{l}$, where *l* is a position along the longitudinal function axis of the union, r is the inner radius of the transition region at position *l*, *lo* is overall length of the transition region along which the wall thickness decreases, and *ro* is the largest inner radius of the transition region. It would have been

obvious to one of ordinary skill in the art at the time of the invention was made to have an electrical resistance heating element wherein the successively decreasing wall thickness is defined by a transition region inner surface having a radius, *r*, over the length transition region, *l*, (with respect to the afore mention function) since it has been held that discovering the optimum value of a result effective variable involves only routine skill in the art.

11. With respect to the limitations claim 3, Heine et al. disclose an electrical resistance element, as set forth in claim 1 of paragraph 6, except for wherein the largest inner radius of the transition region is 3 - 5 times larger than its smallest inner radius. It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have an electrical resistance heating element wherein the largest inner radius of the transition region is 3 - 5 times larger than its smallest inner radius, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

12. With respect to the limitations claim 4, Heine et al. disclose an electrical resistance element, as set forth in claim 1 of paragraph 6, wherein the tube dimensions can vary based on application (column 4, lines 4-11), however, Heine et al. is silent with respect to the exact dimensions of said element (i.e. wherein for the element with a glow zone that has an outer diameter of about 12 mm, its inner diameter is about 10

mm, while the union has an outer diameter of about 12 mm and a smallest inner diameter of about 3 mm, and the progressively decreasing wall thickness of the transition region extends through a distance of about 16 mm). It would have been obvious to one of ordinary skill in the art at the time of the invention was made to have an electrical resistance heating element with the afore mentioned dimensions, since it has been held that discovering the optimum values of a result effective variables involves only routine skill in the art.

Prior Art

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent No. 6,563,095 to Sundberg is a teaching of a resistance heating element comprising $Mo(SI_{1-x}\ AI_x)_2$ and utilizing mullite.

U.S. Patent No. 5,750,958 to Okuda et al. is a teaching of a ceramic glow plug utilizing Re.

U.S. Patent No. 4,749,665 to Yano et al. is a teaching of a low temperature fired ceramic with alumina and mullite..

U.S. Patent No. 4,412,123 to Ray et al. is another teaching of an electric resistance element made out molybdenum disilicide with tapered intersection portion of legs and glow zone.

U.S. Patent No. 6,723,969 to Beatson is a teaching an electrical heating element having tubular portions for cold and hot zones.

U.S. Patent No. 3,607,475 to Schrewelius is another teaching of a molybdenum disilicide combination with SiO_2 to form a heating element.

U.S. Patent No. 6,720,530 to Taniguchi et al. is a teaching of a ceramic heater with several cold/hot zone transition species.

U.S. Patent No. 2,955,145 to Schrewelius is a teaching of a heating element wherein the composition is based on the mixture of $Mo(SI_{1-x}\ AI_x)_2$ and SiO_2.

U.S. Patent No. 2,992,959 to Schrewelius is a heating element wherein the composition is based on the mixture of $MoSI_2$, Al, etc. and SiO_2.

U.S. Patent No. 5,420,399 to Heine is a teaching of an electric heating element and method for producing that involves utilizing pure SiO_2 to increase its efficiency.

U.S. Patent No. 3,725,091 to Chyung et al. is a teaching of a cermet heater and method with a mixture of molybdenum and mullite to allow the thermochemically stable bond thereof.

Japanese Patent No. 05089946 A to Kawamura et al. is a teaching of an electric heating body comprising molybdenum disilicide combination with SiO_2.

Japanese Patent No. 05315057 A to Tsuji et al. is a teaching of the manufacture of a molybdenum disilicide combination with SiO heating element.

U.S. Patent No. 3,269,806; 3,518,351 and United Kingdom Patent No. GB 834,739 are cumulative to or less pertinent than the references relied upon above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen J. Ralis whose telephone number is 571-272-6227. The examiner can normally be reached on Monday - Friday, 8:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robin Evans can be reached on 571-272-4777. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Stephen J Ralis
Examiner
Art Unit 3742

SJR
March 1, 2006

ROBIN EVANS
SUPERVISORY PATENT EXAMINER
3/4/06